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Measuring Intellectual Capital Based on Bozbura Model

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ABSTRACT: The purpose of present study is the presentation of a proper definition to intellectual capital, its components, and the relationship between intellectual capital and market value of quoted companies in Tehran exchange based on Bozbura model. Mostly, the components of intellectual capital were defined in three dimensions of human capital, relation capital and structural capital. The researchers tried to represent the effects of intellectual capital on the market value of quoted companies in Tehran exchange. This study addressed four hypotheses based on the nature and significance of the study. Based on the results of data analysis, there was a significant relationship between human capital and market value of quoted companies in Tehran exchange. Also, structural capital was significantly related to human capital and relation capital.

Key words: Market value, intellectual capital, human capital, structural capital, relation capital, and Tehran exchange.

ORIGINAL ARTICLE

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INTRODUCTION

Knowledge management and its related area emphasize that, achievement of the permanent competition advantage, in concept of global modern economy, is depended on the organization's capacities and abilities, and proper usage of organization's knowledge based sources. It must be mentioned that, all of the organization's sources are not in a same importance level. The structures of organization's properties are in change. In the last the objective properties of organizations were more significant than the subjective properties of organizations but nowadays the subjective properties are more important.

The modern economy which is formed of knowledge and information has the effective role on intellectual capital in research and business branch. The main purpose of the present study is the presentation of a proper definition to intellectual capital, its components, and the relationship between intellectual capital and market value of quoted companies in Tehran exchange, based on Bozbura model.

This study addressed the following questions based on the nature and significance of the study:

Is there any significant relationship between human capital and market value of quoted companies in Tehran exchange?

Is there any significant relationship between relation capital and market value of quoted companies in Tehran exchange?

Is there any significant relationship between structural capital and human capital?

Is there any significant relationship between structural capital and relation capital?

To fulfill the purpose of study and to verify the relationship between intellectual capital and the market value of quoted companies in Tehran exchange, the following hypotheses were stated:

There is a significant relationship between human capital and market value of quoted companies in Tehran exchange.

There is a significant relationship between relation capital and market value of quoted companies in Tehran exchange.

There is a significant relationship between structural capital and human capital.

There is a significant relationship between structural capital and relation capital.

In this area many researches have been done yet, such as (AnvariRostami&Rostami, 2003), (Bontis, 2002), (Kujansivu&Lonnqvist, 2008), (Mouritsen, 2001), (Lynn, 2000), and some articles presented in copenhangen city of Denmark by European Accounting Association.

Origins of study

This part of study is about the concept and components of intellectual capital based on presented model. The intellectual capital is a part of the total capital which is knowledge based and belongs to company. Based on this definition, intellectual capital includes the knowledge transferred to intellectual possession, intellectual assets of a company, and the final results of the transferring process. The standard definition of moral ownership is included some ownership rights such as patent, trade

mark and copy right. These properties are the single form of intellectual capital which is appropriate for accounting aims (AnvariRostami&Rostami, 2003).

Intellectual capital consists of knowledge, information, intellectual assets and experiments used for wealth gathering. It includes subjective group abilities or key knowledge as a group (Bontisetal, 2000).

Intellectual capital includes various intangible sources which are valuable to an organization (Kujansivu&Lonnqvist, 2008).

Mostly, in all models of the intellectual capital assessment which have designed yet, its components are defined in three dimensions of human capital, relation capital and structural capital.

Human Capital

Human capital as a first dimension of intellectual capital is the abilities, skills, and the proficiency of organization's personnel.

The human capital enjoys thought and involves all the abilities and skills of the organization personnel (Lynn, 2000).

In other words the human capital is consisted of general and professional knowledge of personnel, leadership abilities, risk and the problems solving. The main purpose of human capital is goods innovation, services and business importance and the improvement of business process (Mouritsen, 2001). The most important indexes of human capital are the professional competences of personnel, the experiments, the knowledge, the number of company personnel with the earlier related knowledge, and the accurate distribution of responsibilities.

Relation Capital

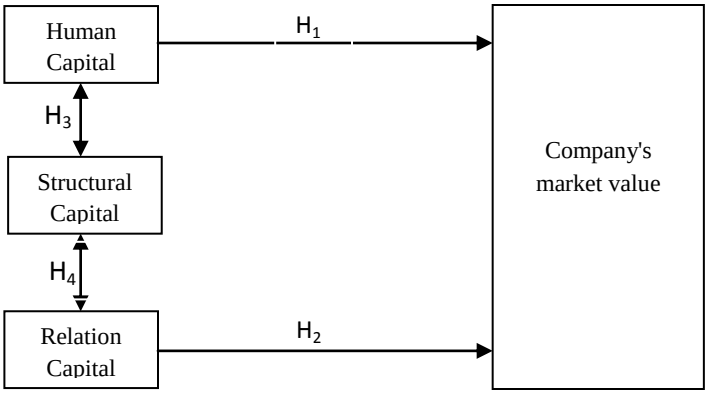
Relation capital as a second dimension of intellectual capital is the representation of company's relations to the out world. It includes out organization's dependence such as customer's loyalty, company's fame, and company's relations with the provider of its sources. On considering the relationship between company and outside, it is observed that there are other factors which are more effective than customers. So the producer relations and society relations must be defined (Bozbura, 2004).

Relation capital includes the company's possessions grant, the company's relations with people, and organization related to customers, customer's preservation or lose rate, market share, and also net profitably per each customer (AnvariRostami&Rostami, 2003).

Structural Capital

Structural capital is the third dimension of intellectual capital which includes capacities to perception of market needs such as patent, knowledge based structures, organizational processes and cultures. This dimension of organizational asset sometimes is named intellectual asset, ultra structure asset, innovation capital or process capital (Bozbura, 2004).

According to above discussion, this study is shown as below:



MATERIAL AND METHOD

The analysis of the data was on the basis of descriptive statistics, which allows the researchers to describe the sample data. The qualitative research model is the former of structural theory for quantitative analysis (Sieber, 1973). From the time point of view, present study is a segmental one which discusses on managers, nurses, and experts points of view of on first half of 2008.

The population of the present study was consisted of all the quoted companies -442 companies which were in several industries- on Tehran exchange.

Because of the company's span and their dispersal in Iran, there was not an access for considering all of the population, so the population was considered by using statistic methods. The research population was a normal distribution. It is used Cochran formula for sample capacity determining by supposing below:

By supposing the hypothesis verification proportion as (P) and the hypothesis deficiency proportion as (q), in equal situation of 50%, error estimate (d =10%) 10% and distance assurance of 95% (t= z =1.96), the content sample of research was determined on the base of Cochran formula: $n = \frac{N(t^2 \times (p.q))}{N(d^2) + t^2 \times (p.q)}$

N: population sample extent

n: selected sample extent

According to above formula the selected sample extent was as follow:

$$n = \frac{442(1.96)^2 \times (\%50 \times \%50)}{442(\%10)^2 + (1.96)^2 \times (\%50 \times \%50)} = \frac{424}{5.38} \approx 78$$

Finally, with the selected sample content of 78 companies at error estimate of 10% and coefficient assurance of 95%, it was claimed that the selected sample had the all characteristics of a population. So, the results were generalized to the total of population.

It was adjusted a questionnaire for hypotheses assuring. This questionnaire consisted of 33 questions which included five choose according to Likert's scale. There were 10 questions on human capital area, 11 question on relative capital and 12 questions on structural capital. It must be mentioned that all of the questions were determined according to below scales:

1) The scales were according to organizational structures of Iranian companies.
2) There was not any industrial prejudice on questionnaire.
3) The introduced scales were qualitative one which could be discussed with the quantitative dimension.
4) Questions were significant. Because of the fact that the problem of the present study was the sufficient unfamiliarity of managers and experts with the concepts of intellectual capital, the scales, and the definition of intellectual capital, the scales, definition of intellectual capital, and its components were submitted them, too.

Human Capital Scales

Bontis (2002) has defined some dimensions of human capital such as the satisfaction of the personnel, underwriter company, motivation, staff preserving, leadership and management, knowledge producing, knowledge distributing, learning, knowledge assembling and the period assigned for personnel instructions (Bontis, 2002). Also, in other study done by Miller, there have been defined some dimensions such as the workers industrial knowledge, the workers learning expense, and the workers high level education such as M.A and P.H.D (Miller et al., 1999).

On designing of the questionnaire, some scales were regarded such as the personnel informing on various information, encouragement of group work, personnel innovation and risk, the personnel ideal level of general skills, and the importance of investment on instructions.

Relation Capital Scales

Relative capital is one of the most important dimensions of the intellectual capital which includes the relationship between company's parts on value chain. It is clear that the fundamental scales of relation capital depend on customer and market. So, besides the shareholders who are the important part of the company, the producers and society must be defined in relation capital. In question designing of relation capital there were regarded some scales such as customer loyalty, customer satisfaction, sale's volume of permanent customers, the number of customer's complaints, the extent of customer's information using in company, customer based information and the market requirements.

Structural Capital Scale

Structural capital is the whole of the assets which make possible the organization creatorship ability. In the research done on Canadian industry, there were some scales which regarded on question designing such as earned income in lieu of R&D expenditure, access to information bases, the presentation manner of new product, creatorship support, management efficiency of company's information systems and financial results created in organization, access to unlimited information, the information system of MIS management, investing on R&D, information bases updating, idea's expanding leadership and new products and productivity increase.

It is used the 15th edition of SPSS software and cronbach technique for determining the question validity. Cronbach's alpha coefficient was between 0 and 1. The 0 was the demonstrator of invalidity, and the 1was the demonstrator of the questions validity. The resultant which its validity was low, it was be not be valid. However, the high validity degree was not the guarantor of appropriate measuring usage. According to Sauders et al. (2009) the alpha coefficient of question's validity must be more than 0.7. The results of human capital scales, intellectual capital scales and structural capital scales analyzed

according to Cronbach test. Human capital alpha coefficient was 0.873, the structural capital alpha coefficient was 0.843 and the relative capital alpha coefficient was 0.823. Because all of these amounts are more than 0.7, it was concluded that the research questions were valid.

RESULTS AND DISCUSSION

Results should be presented with clarity and precision. The results should be written in the past tense when describing findings in the author(s)'s experiments. Previously published findings should be written in the present tense. Results should be explained, but largely without referring to the literature. Discussion, speculation and detailed interpretation of data should not be included in the results but should be put into the discussion section.

It was used a logistic regression line model to affirm the first and second hypotheses as below

$$y = B_0 + B_1 X_1 + B_2 X_2$$

In this formula y was the demonstrator of company's market value, B_0 was axis intersection, B_1 was the human capital inclination, X_1 was the human capital average, B_2 was relative capital inclination and X_2 was the relative capital average. The analysis of present study was done based on K2 of 15th edition of SPSS software. The results were as follow:

In discussion about the first hypothesis: there is a significant relationship between human capital and market value of quoted companies in Tehran exchange, the analysis of this hypothesis showed that sig = 0.021< 0.05, so the rejection probability of H_0 was rejected and H_1 hypothesis was accepted in the 95% assurance.

In discussion about the second hypothesis: there is a significant relationship between relation capital and market value of quoted companies in Tehran exchange, according to the results of data analysis sig= 0.009< 0.05, so the rejection probability of H_1 was rejected and H_1 hypothesis was accepted in the 95% assurance.

After the first and second hypotheses testing, it was computed human capital inclination, B_1 = 0.63, relation capital inclination, B_2 = 0.74, and B_0 = -2.818. Finally the below formula was presented:

$$y = -2.818 + 0.63x_1 + 0.74x_2$$

In discussion about the third hypothesis: there is a significant relationship between intellectual capital and human capital, according to the results of data analysis sig= 0.019< 0.05, so the rejection probability of H_0 was rejected and H_1 hypothesis was accepted in the 95% assurance.

In discussion about the case of last hypothesis: there is a significant relationship between intellectual capital and relation capital, according to the results of data analysis sig= 0.015< 0.05, so the rejection probability of H_0 was rejected and H_1 hypothesis was accepted in the 95% assurance.

CONCLUSION

The results of this study showed that the presented research model is meaningful in Iran industry. Based on the results of data analysis, it was concluded that the main results of the present study was the significant relationship between human capital and the relation capital of quoted companies in Tehran exchange with company's market value. Also, the structural capital of these companies is significantly related to human capital and relation capital.

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